



PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY REPORT ON PATENTABILITY

(Chapter II of the Patent Cooperation Treaty)

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference 29222		FOR FURTHER ACTION		See Form PCT/PEA/416
International application No. PCT/IL2005/000509		International filing date (day/month/year) 17.05.2005		Priority date (day/month/year) 17.05.2004
International Patent Classification (IPC) or national classification and IPC INV. G06F3/033				
Applicant EPOS TECHNOLOGIES LIMITED et al.				
<p>1. This report is the international preliminary examination report, established by this International Preliminary Examining Authority under Article 35 and transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 7 sheets, including this cover sheet.</p> <p>3. This report is also accompanied by ANNEXES, comprising:</p> <p>a. <input checked="" type="checkbox"/> sent to the applicant and to the International Bureau) a total of 11 sheets, as follows:</p> <p><input checked="" type="checkbox"/> sheets of the description, claims and/or drawings which have been amended and are the basis of this report and/or sheets containing rectifications authorized by this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions).</p> <p><input type="checkbox"/> sheets which supersede earlier sheets, but which this Authority considers contain an amendment that goes beyond the disclosure in the international application as filed, as indicated in item 4 of Box No. I and the Supplemental Box.</p> <p>b. <input type="checkbox"/> (sent to the International Bureau only) a total of (indicate type and number of electronic carrier(s)) , containing a sequence listing and/or tables related thereto, in electronic form only, as indicated in the Supplemental Box Relating to Sequence Listing (see Section 802 of the Administrative Instructions).</p>				
<p>4. This report contains indications relating to the following items:</p> <p><input checked="" type="checkbox"/> Box No. I Basis of the report</p> <p><input type="checkbox"/> Box No. II Priority</p> <p><input type="checkbox"/> Box No. III Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</p> <p><input type="checkbox"/> Box No. IV Lack of unity of invention</p> <p><input checked="" type="checkbox"/> Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</p> <p><input type="checkbox"/> Box No. VI Certain documents cited</p> <p><input type="checkbox"/> Box No. VII Certain defects in the international application</p> <p><input checked="" type="checkbox"/> Box No. VIII Certain observations on the international application</p>				
Date of submission of the demand 02.11.2006		Date of completion of this report 14.03.2007		
Name and mailing address of the International preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer Valin, Steven Telephone No. +49 89 2399-5975 		

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
PCT/IL2005/000509

Box No. I Basis of the report

1. With regard to the **language**, this report is based on
- ☒ the international application in the language in which it was filed
 - ☐ a translation of the international application into , which is the language of a translation furnished for the purposes of:
 - ☐ international search (under Rules 12.3(a) and 23.1(b))
 - ☐ publication of the international application (under Rule 12.4(a))
 - ☐ international preliminary examination (under Rules 55.2(a) and/or 55.3(a))
2. With regard to the **elements*** of the international application, this report is based on *(replacement sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to this report):*

Description, Pages

1-38 as originally filed

Claims, Numbers

1-63 filed with telefax on 01.03.2007

Drawings, Sheets

1/8-8/8 as originally filed

- ☐ a sequence listing and/or any related table(s) - see Supplemental Box Relating to Sequence Listing
3. ☐ The amendments have resulted in the cancellation of:
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing *(specify)*:
 - ☐ any table(s) related to sequence listing *(specify)*:
4. ☐ This report has been established as if (some of) the amendments annexed to this report and listed below had not been made, since they have been considered to go beyond the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).
- ☐ the description, pages
 - ☐ the claims, Nos.
 - ☐ the drawings, sheets/figs
 - ☐ the sequence listing *(specify)*:
 - ☐ any table(s) related to sequence listing *(specify)*:

* If item 4 applies, some or all of these sheets may be marked "superseded."

**INTERNATIONAL PRELIMINARY REPORT
ON PATENTABILITY**

International application No.
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Box No. V Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes: Claims	1-63
	No: Claims	
Inventive step (IS)	Yes: Claims	1-63
	No: Claims	
Industrial applicability (IA)	Yes: Claims	1-63
	No: Claims	

2. Citations and explanations (Rule 70.7):

see separate sheet

Box No. VIII Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

**INTERNATIONAL PRELIMINARY
REPORT ON PATENTABILITY
(SEPARATE SHEET)**

International application No.

PCT/IL2005/000509

Re Item V

**Reasoned statement with regard to novelty, inventive step or industrial applicability;
citations and explanations supporting such statement**

1 PRIOR ART

Reference is made to the following documents:

- D1: WO 03/088136 A (EPOS TECHNOLOGIES LIMITED; ALTMAN, NATHAN; ELIASHIV, ODED) 23 October 2003 (2003-10-23) cited in the application
- D2: US-A-4 814 552 (STEFIK ET AL) 21 March 1989 (1989-03-21)
- D3: EP-A-0 312 481 (EZQUERRA PEREZ, JOSE MANUEL; SANCHEZ FERNANDEZ, FRANCISCO JOSE; NOMBEL) 19 April 1989 (1989-04-19)

D3 teaches of an ultrasonic position detection system in which the position of an object is established by geometric triangulation using distance measurement data obtained from an ultrasonic transmitter attached to the object being monitored and from physically separated ultrasonic receivers. Operating synchronisation is provided by an infrared emitter located on the object and which delivers a signal at the instant the ultrasonic emitter delivers a signal, thus, allowing the ultrasonic transmission time to be utilised as a measure of distance. In another embodiment, the infrared emitter is associated with the receiver system which delivers a signal to a receiver at the object petitioning the ultrasonic emitter to transmit a signal, thus providing greater precision.

D2 also discloses an ultrasound position input device for a computer system. In operation, the stylus transmits an infrared signal which the system receives immediately and an ultrasound pulse which two microphones receive after a delay which is a function of the speed of sound and the distance of the stylus from each microphone. From this information the system can calculate the position of the stylus. Switches for indicating functions are mounted on the stylus. Multiple styluses can be used, each transmitting a distinctive identification code so that the system can determine which stylus is the signal source.

D1, from the same applicant as the present application, teaches of an acoustic-based

position detection system comprising a positional element for attaining a position and comprising a first emitter for emitting a substantially continuous ultrasonic waveform decodable to fix said position, and a detector arrangement for detecting said waveform in a manner permitting fixing of said position and outputting said waveform for computation, in a manner retentive of said position fixing ability. The positional element also comprises a second emitter, operable to use IR or RF signaling, and used for timing the ultrasonic waveform. To address the synchronization issue between the positional element and the base station (positioning device), it is suggested that the positional element comprise a detector and the base station an emitter for sending a command to the positional element via, for example, an infrared signal in order to signal the pointing device to emit the ultrasonic waveform.

2 INDEPENDENT CLAIM 1

Document D1, which is considered to represent the most relevant state of the art, discloses an acoustic-based positioning system from which the subject-matter of claim 1 differs in that claim 1 includes a synchronization signal which is transmitted by the positional element to the positioning device within a time frame having a fixed duration and is continuously repeated, said time frame being known to the positioning device, and said synchronization signal being a sequence of at least two synchronization sub-signals, each synchronization sub-signal bearing timing data for the continuously modulated acoustic waveform, thereby to improve the accuracy of the fixing of the position, said at least two synchronization sub-signals allowing the positioning device to derive clock clock synchronization data by correlating said timing data and said known time frame duration.

The subject-matter of claim 1 is therefore new (Article 33(2) PCT).

The problem to be solved by the present invention may be regarded as how to improve the accuracy of the position fixing of the device disclosed in D1.

The solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT) because none of the prior art uncovered in the international search appears to disclose or suggest the use of a synchronization signal as described in claim 1 to improve the accuracy of an acoustic based positioning

system according to claim 1.

To address the synchronization issue between the positional element and the base station (i.e., positioning device), it is suggested in D1 the base station further comprise an emitter for sending a command to the positional element via, for example, an infrared signal, in order to signal the pointing device to emit the ultrasonic waveform; and that the positional element of D1 further comprise a detector for detecting said signal. Thus, D1 appears to teach away from the solution proposed in claim 1.

While D1 does suggest that in order to solve the synchronization problem found in D1 between the base station (positioning device) and the host (PC), the base station could send a synchronization pattern in a certain time or frequency slot and that the host could use this pattern to determine the phase difference between its own clock and the base clock, it does not suggest that the positional element send this pattern to the base station nor that the synchronization pattern be a signal comprised of at least two sub-signals, each bearing timing data for the acoustic waveform.

Thus, the solution to this problem proposed in claim 1 of the present application is considered as involving an inventive step (Article 33(3) PCT).

Claims 2-32 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

3 INDEPENDENT CLAIM 33

Independent method claim 33 is the method-claim analog to independent system claim 1 and, therefore, the same reasoning applies, *mutatis mutandis*, to the subject-matter of claim 33, which is, therefore, also deemed to be novel and involving an inventive step (Articles 33(2) and 33(3) PCT).

Claims 34-62 are dependent on claim 1 and as such also meet the requirements of the PCT with respect to novelty and inventive step.

4 INDEPENDENT CLAIM 63

Independent claim 63 is directed to a system with the same features as the system of claim 1, with the addition of another detector arrangement for additionally determining the attitude of a positional element. This claim, having all of the features of claim 1, should, in accordance with Article 6 PCT and the requirements of conciseness and clarity, should be drafted as a dependent claim. However, this lack of clarity notwithstanding, the subject-matter of the claim is considered to be novel and to involve an inventive step in the sense of Articles 33(2) and 33(3) PCT for the same reasons as the subject-matter of claim 1, applied, *mutatis mutandis*, to claim 63.

Re Item VIII

Certain observations on the international application

The above report was carried out based on the following assumptions in order to overcome remaining minor clarity issues.

1 Claim 1

Beginning at the third line from the bottom of this claim, the phrase "said at least one positional device" has been understood as "said positioning device." Support for this interpretation is found on p. 8, ll. 5-6 of the Description.

2 Claim 63

Beginning at the third line from the bottom of this claim, the phrase "said positional device" has been understood as "said positioning device." Support for this interpretation is also found on p. 8, ll. 5-6 of the Description.